Ch 7 Binary Variables and logistic regression

Response: $y_i \sim Bin(n_i, p_i)$

Link: *probit*, *logit* or *cloglog*

Linear component: $\eta_i = x_i^T \beta$

Examples: Shooting balloons, dispersal of house sparrows (vs wing length)

Ch 7.4 General logistic regression model

Response: $y_i \sim Bin(n_i, p_i)$

Link: logit; $\eta_i = \log \frac{p_i}{1-p_i}$

Linear component: $\eta_i = x_i^T \beta$

Dispersal of House sparrows

If house sparrows disperse / move from the hatch island, they do it the first year.
Model dispersal with

- Hatch year
- Sex
- Wing length

Q1: Does dispersal differ between (hatch) islands?

Q2: Does dispersal differ between island and sex?

Q3: Does wing length influence dispersal?

Q4: For a bird with hatch island 2, sex F and wing length $5cm$, what is the probability it will disperse?

Embryogenic anthers

Storage		c=40	c=150	c=350
Control	y_{1k}	55	52	57
	n_{1k}	102	99	108
Treatment	y_{2k}	55	50	50
	n_{2k}	76	81	90

Deviance

Let β_{max} be the parameter vector for the *saturated* modeled, and β for the model of our interest. Let $l(\beta; y)$ be the log-likelihood function. The *deviance* of the model is

$$D = 2(l(b_{max}; y) - l(b; y)$$

where b and b_{max} are (ML) estimates.

Binominal pdf

$$f(y; n, p) = \binom{n}{y} p^y (1-p)^{n-y}$$